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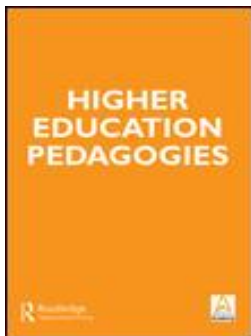
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A systematic review protocol on the use of online learning versus blended learning for teaching clinical skills to undergraduate health professional students

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ABSTRACT

Aim: This paper is a review protocol that will be used to identify, critically appraise and synthesise the best current evidence relating to the use of online learning and blended learning approaches in teaching clinical skills in undergraduate health professionals. **Background:** Although previous systematic reviews on online learning vs. face to face learning have been undertaken a systematic review on the impact of online learning and blended learning for teaching clinical skills has yet to be considered in undergraduate health professionals. By reviewing the students' online learning experiences, systems can potentially be designed to ensure all health professional students' are supported appropriately to meet their learning needs. **Methods/design:** The key objectives of the review are to evaluate how online learning teaching strategies assist students learn; to evaluate the students' satisfaction with this form of teaching; to explore the variety of online learning strategies used; to determine what online learning strategies are more effective and to determine if supplementary face to face instruction enhances learning. A search of the following databases will be made MEDLINE, CINAHL, BREI, ERIC and AUEI. This review will follow the Joanna Briggs Institute guidance for systematic reviews of quantitative and qualitative research. **Conclusion:** This systematic review protocol intends to support the undertaking of a systematic literature review which will report on a combination of student experience and learning outcomes therefore increasing its utility for educators and curriculum developers involved in health care education.

KEYWORDS

Blended learning; online learning; education; health professionals review protocol

Introduction

Contemporary higher education policy and practice has an increased interest for the development of technology-based learning (Atwood, 2009; BIS, 2011; The Higher Education Academy [HEA], 2014). This need can be attributed to many factors, including the advancement of educational technology systems, a growing technology focused

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student population, the potential for financial savings and the demands for Higher education Institutions (HEI) to recruit international students (Cook et al., 2010; HEA, 2014; Howatson-Jones, 2012). Although there are many valid reasons for the need to increase the e-learning modality it remains comparatively underused in higher education (Wiesenbergh & Stacey, 2009), with concerns expressed about the effective use of technology to improve the students learning experience (Kirkwood & Price, 2014).

One of the most recent teaching strategies designed from a need to provide support to online learning is the development of a hybrid or blended learning pedagogy. This blended learning approach combines both didactic teaching methods with technology-enhanced learning activities. Anderson and May (2010) suggested that there is an increased benefit to the students' learning experience if a combined approach is undertaken. This type of learning has been described as a 'low-risk strategy' for HEIs to take (Garrison & Kanuka, 2004, p. 96). It has enabled the integration of online learning into educational programmes that have held a traditional class led didactic paradigm. However, by combining two different pedagogies it can be difficult to determine the associated cause and effect of teaching and learning (McCutcheon, 2013).

Health professional educational programmes require students to have training both in clinical skills and the supportive theoretical principles that apply to these clinical skills. Although previous systematic reviews on online learning vs. face-to-face learning have been undertaken (Cavanaugh, Barbour, & Clarke, 2009; Cook et al., 2010), a systematic review on the impact of online learning vs. blended learning for teaching clinical skills has yet to be considered in undergraduate health professional programmes. With the increased demand in higher education to increase the quantity of online teaching delivery, it is imperative that a review that synthesises all the available empirical data on online vs. blended learning for teaching clinical skills is undertaken.

The review

Aim

The aim of the review is to answer the following question:

What is the impact, both measured and perceived, of online compared to a blended learning approach for teaching clinical skills to undergraduate health professional students?

Objectives

The primary objective of the review is to compare how online learning vs. blended learning in clinical skills assist undergraduate health professional students learn, for example in:

- Clinical skill development
- Knowledge
- Actualisation of learning content

The secondary objectives are:

- (1) To explore the variety of online learning strategies used
- (2) To determine what online learning strategies are more effective
- (3) To determine if supplementary face to face instruction enhances learning

Design

In health care systematic reviews have traditionally focused on quantitative data. Recent challenges to this ideology have indicated that the inclusion of qualitative research evidence is beneficial in reflecting the experiences of target groups which can enhance the review and guide practice (Cochrane Qualitative and Implementation Methods Group, 2012; Gough, 2007; JBI, 2008). Harden (2010) has also suggested that the integration of other data derived from qualitative and mixed methods studies can enhance a reviews utility and impact. This review protocol considers both quantitative, mixed methods and qualitative studies to enhance and maximise the findings.

Quality assurance and transparency of results are essential in a systematic review and the use of a validated framework can provide these components. This non-funded systematic review follows the design template from the Joanna Briggs institute (JBI) for conducting systematic reviews of both quantitative and qualitative research (JBI, 2013). The JBI is an established international collaboration that uses recognised quality appraisal tools to explore the evidence from a variety of methodologies.

Inclusion/exclusion criteria

Types of studies

The review will include studies that explore online learning and blended learning for undergraduate health professional students. Experimental design studies such as randomised controlled trials and quasi-controlled trials will be considered as will cohort studies, observational studies and surveys.

Qualitative studies that report the student's perceptions of online learning will be included such as case reports and action research studies.

Types of participants

Studies will be included if they involve health professional students who are receiving learning through an online or blended learning modality. This review will include students at any stage of their undergraduate training.

Studies involving postgraduate and post-registration students will be excluded.

Studies that report only on instructor/teacher experience will be excluded.

Types of intervention

Studies that explore the effect of either a blended or an online learning teaching strategy for the development of a clinical skill will be included. Only courses, modules, sessions and resources that are purely concerned with clinical skill development will be considered. Online learning is recognised as a mode of learning that is technology based and is primarily conducted through the Internet and is exclusive of face-to-face contact with a lecturer. Online learning strategies that are web based stand alone educational software, pure computer screen simulation and internet discussion forums will be considered in this review.

Simulation studies will be excluded as this occurs mainly in simulation laboratories with instructor supervision. E-learning strategies that are purely print-based correspondence, video conferencing, broadcast, television or radio will be excluded.

Table 1. Medline search terms.

1.	Education, Undergraduate/or Education, Nursing, Diploma Programs/or Education, Nursing, Baccalaureate/ Nursing/or Education/allied health professional/medicine
2.	Computer-Assisted instruction/
3.	Hybrid learning.mp.
4.	Combined learning.mp.
5.	Distributed learning
6.	Blended learning.mp.
7.	3 or 4 or 5 or 6
8.	1 and 7
9.	Web-based learning.mp.
10.	Internet-based learning.mp.
11.	E-learning.mp.
12.	Online learning.mp.
13.	Virtual learning.mp.
14.	2 or 9 or 10 or 11 or 12 or 13
15.	1 and 14
16.	Clinical skill.mp. or clinical competence/
17.	15 and 16
18.	8 and 16

Studies will be excluded if the online learning teaching strategy used is for the primary development of theoretical knowledge and not clinical skills.

Types of outcome measures

The review will report on all learning outcome measures that explore the impact on the development of clinical skills, actualisation of learning and assessment of knowledge.

Outcomes will be reported that explore the impact and effect of supplementary face-to-face instruction including, knowledge, engagement in the learning activity and clinical skill development.

All outcomes that are teacher/instructor focused will not be considered in this review.

Search methods

The search methods used here are comparable to a systematic review protocol developed by McColgan and Blackwood (2009) to evaluate teaching in higher education. Prior to commencing a systematic search for primary literature, confirmation of any existing systematic reviews will be made through the Database of Abstracts and Reviews. The main search of primary literature will identify a wide range of studies capturing an extensive review of current thinking on the subject of online learning and health professional education. Computerised searches of MEDLINE, CINAHL, BREI, ERIC and AUEI will be performed. As increased popularity with the Internet and the World Wide Web did not begin until the mid-1990s a search period from 1995 to 2013 will be used to search all data bases. A exploration to discover unpublished studies will be undertaken by scanning OCLC dissertation, Index of Thesis, ISI conference proceedings and Cambridge Scientific Abstracts.

Specific search terms will be used and the descriptors will include synonyms for e-learning such as Massive Open Online Courses and applications (Apps) (Table 1). Only papers published in English will be accepted. The bibliographies from relevant studies will be checked to identify missed papers from the initial search. A citation search using the Science Citation Index will also be conducted.

Also a search of the following websites will be made to determine any developing research studies:

- <http://www.campbellcollaboration.org/>
- <http://eppi.ioe.ac.uk/cms/>
- http://www.joannabriggs.edu.au/pubs/systematic_reviews

Two reviewers will independently check the titles and abstracts identified by electronic searching. Following this, the same reviewers will conduct an autonomous review of the full text versions of potentially relevant studies using a pre-study eligibility form.

Quality appraisal

As described by McColgan and Blackwood (2009) a systematic review necessitates a clear unambiguous process to indicate equality in study selection. All of the studies acknowledged as meeting the inclusion criteria stipulated in the reviews eligibility form will be assessed for methodological quality by a primary and a secondary reviewer. The secondary reviewer will be blinded to the outcomes of the primary reviewer's assessment. When both reviewers' have finished the process the primary reviewer will then evaluate the two sets of appraisals.

The quantitative research studies will be assessed using a critical appraisal tool taken from the JBI-MAStARI assessment and review instrument. The qualitative studies will be assessed using the critical appraisal tool taken from JBI QARI for assessing interpretive and critical research. The responses to the questions asked will identify each study's risk of bias. Following this each study will be classified into one of the following categories:

- Low risk of bias: all criteria met
- Moderate risk of bias: one or more criteria unclear
- High risk of bias: one or more criteria not met.

Data extraction

Data extraction will be undertaken using a standardised quantitative data and qualitative data extraction form. Both reviewers will receive instruction in the use of the data extraction forms before undertaking any assessments. A pilot of the data extraction forms will be performed prior to commencement of the review.

Following independent data extraction a meeting will be held with co-reviewers to resolve any discrepancies and obtain consensus. Any unresolved disagreement will be referred to a third party for arbitration.

Synthesis

Systematic synthesis is a quality appraisal process that pools together the evidence extracted from included studies to collectively answer a research question (McColgan & Blackwood, 2009). Quality appraisal through systematic synthesis is essential to ensure that practice is evidenced based and fit for purpose.

Where possible quantitative data will be pooled for statistical analysis using the Review Manager software from the Cochrane collaboration (RevMan 5.2, 2012). Where statistical

pooling is not achievable, due to a lack of available studies, findings will be reported in narrative form.

Discussion

The main issue raised through this review centres on the broad variation in content of online and blended learning pedagogies. There are a variety of online learning systems and packages available and this could make the comparability of studies difficult because of the heterogeneity between studies. As Moore, Dickson-Deane, and Galyen (2011) suggested there is a relaxed use of terminology in the area of online learning making this an area difficult to evaluate unless knowledge of the design infrastructure is explicit. This is further confounded by the development of hybrid or blended approaches to online learning delivery which vary in nature, time and content. Cavanaugh et al. (2009) reported that blended learning often included extra learning time and instructional elements not included in the control arm of studies. They concluded that the positive effects observed from a blended learning approach could not just be attributed to the media used (Cavanaugh et al., 2009). Therefore, there are many variations not only in relation to the type of online learning systems used but also in the delivery of its content. These variations could create difficulty in analysis, making it challenging to draw definitive conclusions.

This systematic review protocol considers quantitative and qualitative empirical studies that exist on the use of online vs. blended learning for the teaching of clinical skills to health professional students. The need for robust and transparent outcomes are necessary to ensure confidence and acceptance of the results found (Yuan & Hunt, 2009). The methodology reported on has been adapted from the JBI, a global association accepted as promoting and supporting best practice (JBI, 2013). JBI suggests that by creating a robust protocol a mixed methods systematic review can direct practice. This review intends to report on a combination of clinical skill and learning outcomes therefore increasing its utility for educators and curriculum developers.

The robust structure of this systematic review protocol will enable the critical appraisal and synthesis of the best evidence pertaining to the use of online vs. blended learning for teaching clinical skills in undergraduate health professional education. Due to the evolving nature of online learning there is a diversity of pedagogy style, learning time, learning content and systems design. Therefore, the extent to which clear conclusions can be drawn about the effectiveness of online learning for the teaching of clinical skills may be limited. However, this review will provide clarity to the existing evidence and its implications for educators in undergraduate health care-related degree programmes and provide direction for further research in this area. It will be of significant interest to curriculum developers and to those involved in teaching clinical practice skills such as nursing, medicine and other health care-related professions.

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